

Claims:

1. A light emitting diode (LED) display device comprising:
a substrate;
5 a plurality of walls disposed on the substrate, the plurality of walls forming a cavity, the cavity being filled with an encapsulant, the encapsulant not including fluorescent material;
an LED disposed on a first portion of the substrate within the cavity;
an electrical connection between the LED and a second portion of the
10 substrate; and
a fluorescent material overlay at a top end of the cavity.
2. A light emitting diode display device according to claim 1, wherein the fluorescent material overlay includes a layer of phosphor particles.
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3. A light emitting diode display device according to claim 1, wherein the fluorescent material overlay has a substantially consistent thickness and includes a substantially uniform matrix of phosphor particles.
- 20 4. A light emitting diode display device according to claim 1, wherein the fluorescent material overlay includes a combination of two or more fluorescent material types.
5. A light emitting diode display device according to claim 1, wherein the
25 fluorescent material overlay includes phosphor particles having a mean diameter within the range of 1 micrometer to 50 micrometer.
6. A light emitting diode display device according to claim 1, wherein the fluorescent material overlay includes phosphor particles having a mean
30 diameter within the range of 10 nanometer to 100 nanometer.
7. A light emitting diode display device according to claim 1, wherein the fluorescent material overlay includes organic dye.

8. A light emitting diode (LED) display device comprising:
a substrate;
a plurality of walls disposed on the substrate, the plurality of walls
5 forming a cavity;
an LED disposed on a first portion of the substrate within the cavity;
an electrical connection between the LED and a second portion of the
substrate; and
a fluorescent material overlay at a top end of the cavity, the fluorescent
10 material overlay including a plastic layer and layer of fluorescent material.
9. A light emitting diode display device according to claim 8, wherein the
fluorescent material overlay has a substantially consistent thickness and
includes a uniform matrix of phosphor particles.
- 15 10. A light emitting diode display device according to claim 8, wherein the
fluorescent material overlay includes a combination of two or more fluorescent
material types.
- 20 11. A light emitting diode display device according to claim 8, wherein the
fluorescent material overlay includes phosphor particles having a mean
diameter within the range of 1 micrometer to 50 micrometer.
12. A light emitting diode display device according to claim 8, wherein the
25 fluorescent material overlay includes phosphor particles having a mean
diameter within the range of 10 nanometer to 100 nanometer.
13. A light emitting diode display device according to claim 8, wherein the
fluorescent material overlay includes organic dye.
- 30 14. A light emitting diode (LED) display device comprising:
a substrate;

a plurality of cavities, each of the plurality of cavities formed within a plurality of walls disposed on the substrate;

a plurality of LEDs, each of the plurality of LEDs disposed within a separate one of the plurality of cavities, each of the plurality of LEDs disposed
5 on a first portion of the substrate;

a plurality of electrical connections, each of the plurality of electrical connections connecting one of the plurality of LEDs to one or more respective second portions of the substrate; and

a fluorescent material overlay at a top end of the plurality of cavities.
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15. A light emitting diode display device according to claim 14, wherein the fluorescent material overlay includes a layer of phosphor particles.

16. A light emitting diode display device according to claim 14, wherein the
15 fluorescent material overlay has a substantially consistent thickness and includes a substantially uniform matrix of phosphor particles.

17. A light emitting diode display device according to claim 14, wherein the fluorescent material overlay includes phosphor particles having a mean
20 diameter within the range of 1 micrometer to 50 micrometer.

18. A light emitting diode display device according to claim 14, wherein the fluorescent material overlay includes phosphor particles having a mean diameter within the range of 10 nanometer to 100 nanometer.
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19. A light emitting diode display device according to claim 14, wherein the fluorescent material overlay includes organic dye.

20. A light emitting diode display device according to claim 14, wherein the
30 fluorescent material overlay include a plurality of fluorescent material types, and each of the plurality of fluorescent material types corresponds to a portion or portions of the plurality of cavities.